ANNUAL REPORT FOR 2000

Mashoes Road Mitigation Site

Dare County

Project No. 8.T051402

TIP No. R-2551WM

Prepared By:
Natural Systems Unit & Roadside Environmental Unit
North Carolina Department of Transportation
December 2000

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2000 REPORT – EXECUTIVE SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the Mashoes Road Mitigation Site. Construction began on this site in 1998. The west side of Mashoes Road was completed in early 1999 and was planted with trees; the east side of Mashoes Road was completed in the fall of 1999 but was not planted due to phragmite's control. The site will be planted with marsh grass in the Spring of 2001. Monitoring activities in 2000 represent the second year of monitoring for the west side of the mitigation site. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the project is deemed successful. The five years will not begin for the east side until 2001.

The site contains six groundwater monitoring gauges (on the west side), eight surface gauges (on the east side), and five vegetation plots.

This year, rainfall data has been acquired from two sources. From the beginning of the growing season to June, the daily rainfall on the gauge data graphs was recorded at a rain gauge at the Manteo Airport (Dare County), maintained by the NC Climate Office. Since June, one infinity rain gauge installed on the site has provided local rainfall data.

Hydrologic monitoring indicated that the site is continuing toward success. Under normal conditions for 2000, all six of the groundwater gauges met the jurisdictional hydrologic success for at least 12.5% of the growing season. All eight of the surface gauges showed steady tidal influence that maintained a water elevation above zero under normal conditions.

Vegetation monitoring yielded 299 trees per acre, below the 320 tree requirement. Therefore, the site will be replanted in the Winter of 2001.

Based on the monitoring results for this growing season, NCDOT proposes to continue hydrologic and vegetation monitoring.

1.0 INTRODUCTION

1.1 Project Description

The Mashoes Road Wetland Mitigation Site is located north of Manns Harbor in Dare County (Figure 1). It is bounded by US 64-264 to the south, the Alligator River National Wildlife Refuge to the west, the Croatan Sound to the east, and is bisected into east/west by SR 1113 (Mashoes Road).

A significant portion of the site (254 acres) was classified as a coastal marsh and fell under the jurisdiction of the N.C. Division of Coastal Management. Another portion (107 acres) was classified as forested wetlands. The remainder of the site was comprised of a 15-acre pond, borrow pits and cleared uplands from a sand mining operation, and some forested uplands.

The site encompasses approximately 399 acres and is designed as a mitigation site primarily for the new Croatan Sound Bridge between Manns Harbor and Manteo , TIP Project R-2551 (USACE Action ID No. 199502334).

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for a minimum of five years or until success criteria are fulfilled. Success criteria are based on federal guidelines for wetland mitigation. These guidelines stipulate criteria for both hydrologic conditions and vegetation survival. The following report details the results of hydrologic and vegetative monitoring during 2000 at the Mashoes Road Mitigation Site.

Activities in 2000 reflect the second year of hydrologic monitoring following the initial construction of the site. 2000 is the second year of vegetation monitoring for the west side; vegetation monitoring has not begun for the east side, because the marsh grass will not be planted until spring 2001. Included in this report are analyses of both hydrologic and vegetative monitoring results as well as local climate conditions throughout the growing season.

1.3 Project History

Winter 1999	Site Construction Complete (West Side)
Spring 1999	Wetland Trees Planted (West Side)
March 1999	Monitoring Gauges Installed (Entire Site)
March – November 1999	Hydrologic Monitoring (Entire Site)
October 1999	Vegetation Monitoring (West Side, 1 yr.)
March – November 2000	Hydrologic Monitoring (Entire Site)
October 2000	Vegetation Monitoring (West Side, 2 yr.)

1.4 Permit Requirements

The Mashoes Road Mitigation Site was constructed primarily to compensate for impacts to TIP Project R-2551 (USACE Action ID No. 199502334). Permit commitments stated that *phragmites australis* would be totally controlled in the marsh area.

The permit was modified in 2000, which allowed for marsh planting to be extended to the spring of 2001. This gave NCDOT additional time to further treat for phragmites.

The site was treated for phragmites in 2000. The planting of marsh grass at the site will be completed in Spring 2001.

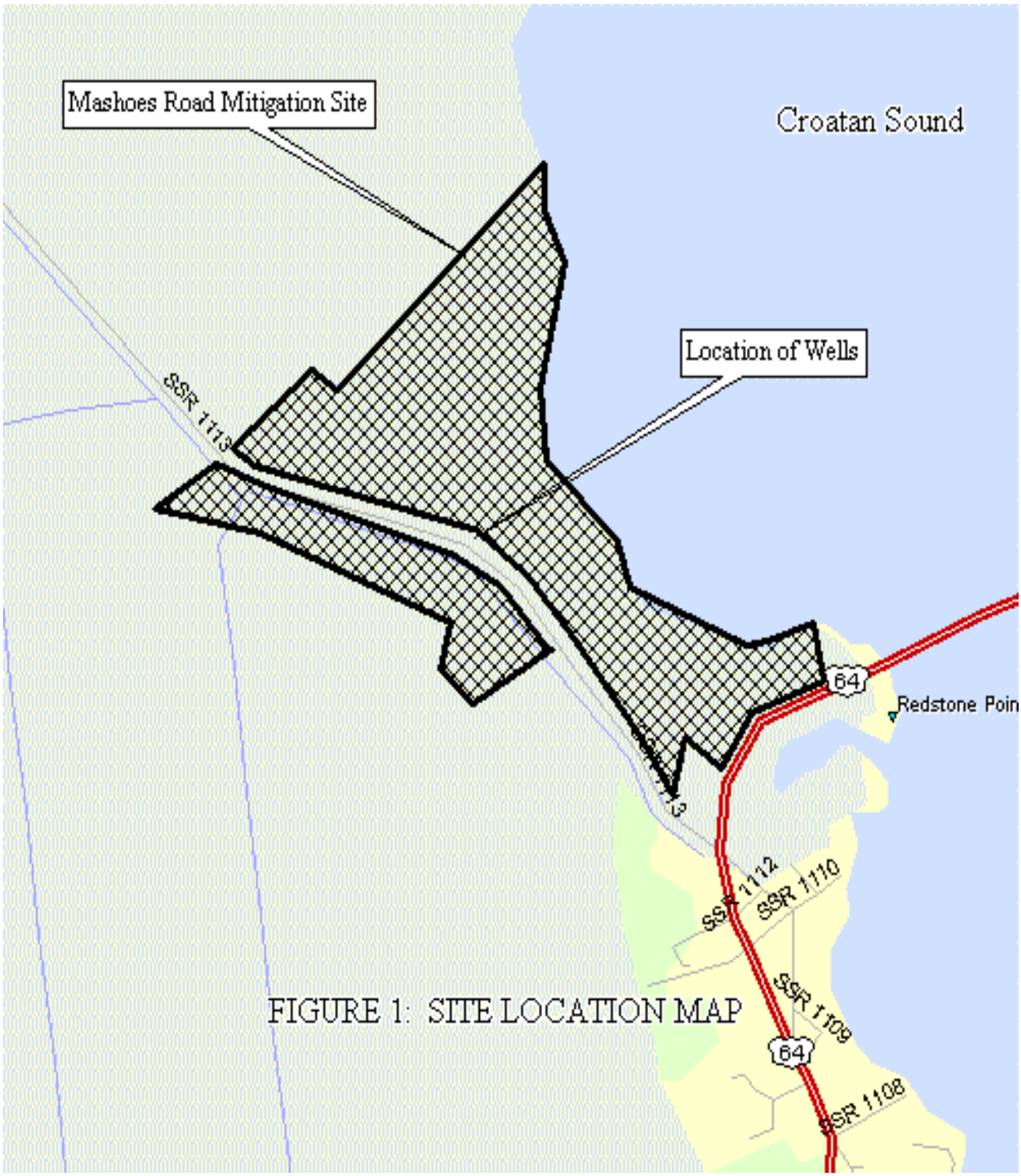


FIGURE 1: SITE LOCATION MAP

2.0 HYDROLOGY

2.1 Success Criteria

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12" of the surface) by surface or ground water for at least 12.5% of the growing season. Areas inundated less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% - 12.5% of the growing season can be classified as wetlands depending upon other factors, such as the presence of hydrophytic vegetation and hydric soils.

The growing season in Dare County begins March 13 and ends November 25. The dates correspond to a 50% probability that temperatures will drop to 28° F or lower after March 13 and before November 25.[1] The growing season is 258 days; therefore the optimum duration for wetland hydrology is 32 days. Also, local climate must represent average conditions for the area.

2.2 Hydrologic Description

Historically, the wetlands on this tract were part of the coastal marsh of the surrounding area. The primary sources of hydrology are tidal flushing of the system and groundwater. After an extensive study of the site's hydrology, it was concluded that filling of the ponds, and grading down of the upland areas would elevate the groundwater to a level that would saturate the soil stratum within the required twelve inches or even flood the area during high tides. It was predicted that this would be sufficient to restore wetland hydrology.

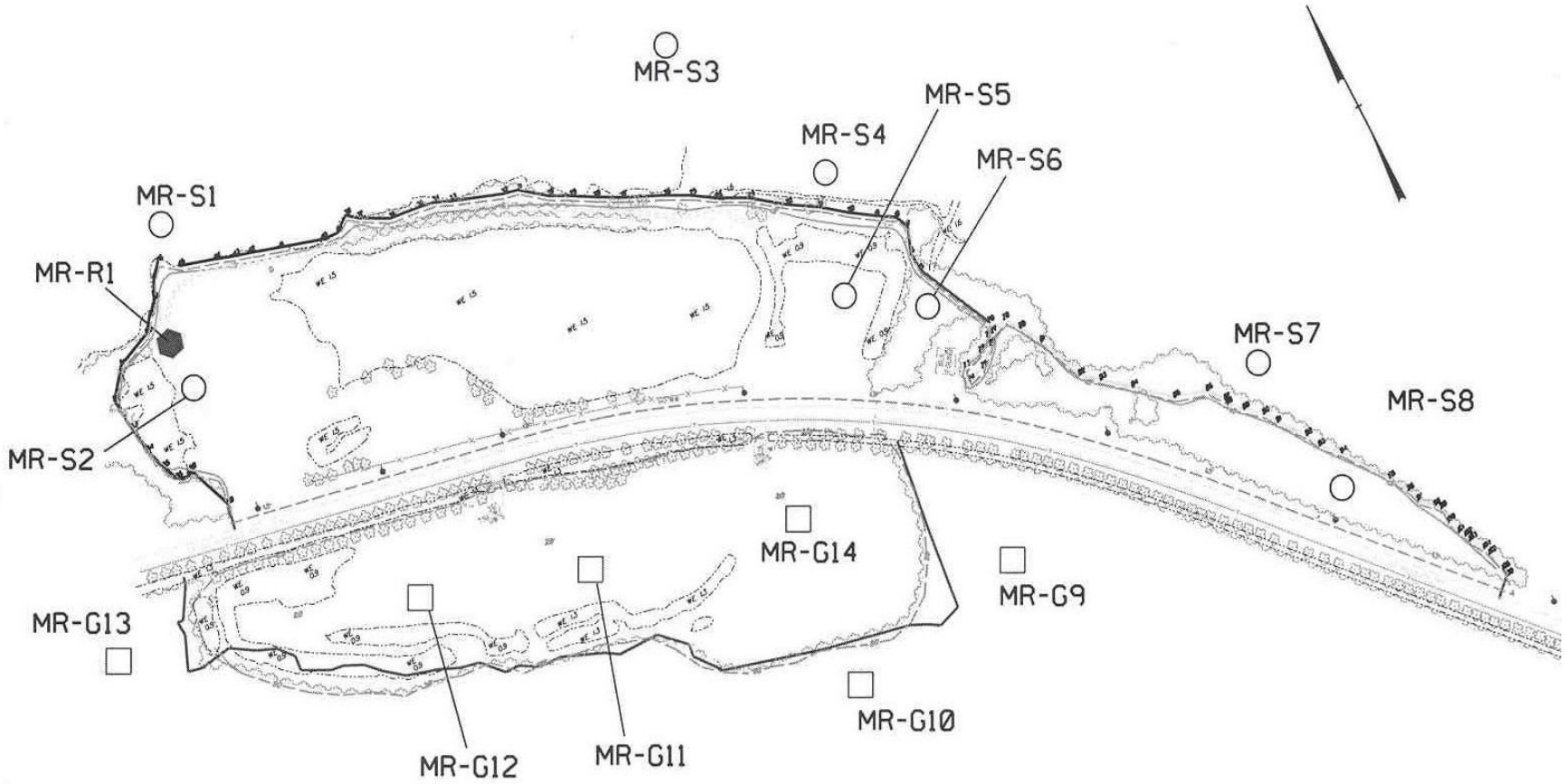
Six groundwater monitoring gauges, eight surface gauges, and one rain gauge were installed in 1999 (Figure 2). The rain gauges and monitoring gauges recorded daily readings of rainfall and depth to groundwater, respectively. The surface gauges record tidal conditions eight times daily; however, only one representative reading was used for graphing and statistical purposes in this report.

The daily rainfall for the site is recorded from a combination of two sources. Prior to June, the average of the daily rainfall recorded by a rain gauge located at the Manteo Airport was used; this rainfall data was provided by the NC State Climate Office. Since June, the rainfall data was acquired from a new onsite rain gauge.

[1] Natural Resources Conservation Service, Soil Survey of Dare County, North Carolina, p.69.

MASHOES ROAD MITIGATION SITE

DARE COUNTY



SURFACE WATER GAUGE
GROUNDWATER MONITORING GAUGE
RAIN GAUGE

FIGURE 2: MONITORING GAUGE LOCATIONS

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

For groundwater monitoring gauges on the west side of the mitigation site, the maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each gauge. For surface gauges, the ground surface was used (elevation zero) to give a better representation that the east side of Mashoes Road was receiving daily tidal flooding. This number was converted into a percentage of the 256-day growing season. Table 1 presents the 2000 results. In the table, "MR" refers to Mashoes Road Mitigation Site, "S" refers to surface gauges, and "G" refers to groundwater gauges.

Appendix A contains a plot of the groundwater depth for each monitoring gauge. The maximum number of consecutive days that the gauge met success above this 12-inch depth is noted on each graph. Data determined to be erroneous was omitted; therefore, some gaps appear in the plots.

Precipitation events are included on each graph as bars.

Table 1
2000 HYDROLOGIC MONITORING RESULTS
(MARCH 17 – NOVEMBER 25)

Monitoring Gauge	< 5% (<13 dy)	5 - 8% (13-20 dy)	8 – 12.5% (21-32 dy)	> 12.5% (>32 dy)	Actual %	Dates Meeting Success
MR-S1 (ref)				✔	82.6	3/14 – 11/11
MR-S2				✔	89.5	4/9 – 11/25
MR-S3 (ref)				✔	100	3/13 – 11/25
MR-S4 (ref)				✔	100	3/13 – 11/25
MR-S5				✔	74.4	4/11 – 10/19
MR-S6				✔	100	3/13 – 11/25
MR-S7 (ref)				✔	100	3/13 – 11/25
MR-S8				✔	100	3/13 – 11/25
MR-G9 (ref)				✔	81.4	3/13 – 10/21
MR-G10 (ref)				✔	100	3/13 – 11/25
MR-G11				✔	18.2	10/10 – 11/25
MR-G12				✔	45.0	8/2 – 11/25
MR-G13 (ref)				✔	69.0	6/1 – 11/25
MR-G14				✔	100	3/13 – 11/25

Notes: "MR" denotes Mashoes Road site gauges.
"S" denotes surface gauges.
"G" denotes groundwater gauges.
"ref" denotes gauges in reference wetlands.

It should be noted that the graph for MR-G11 (see Appendix A) shows the hydrologic reading to be much lower than the 12-inch requirement. Geotechnical Unit checked the gauge and determined that it was malfunctioning. The gauge was finally replaced in October> Consequently, the hydrological data showed much better conditions in October and November, giving a >12.5% result. This gauge will be closely monitored to verify the accuracy.

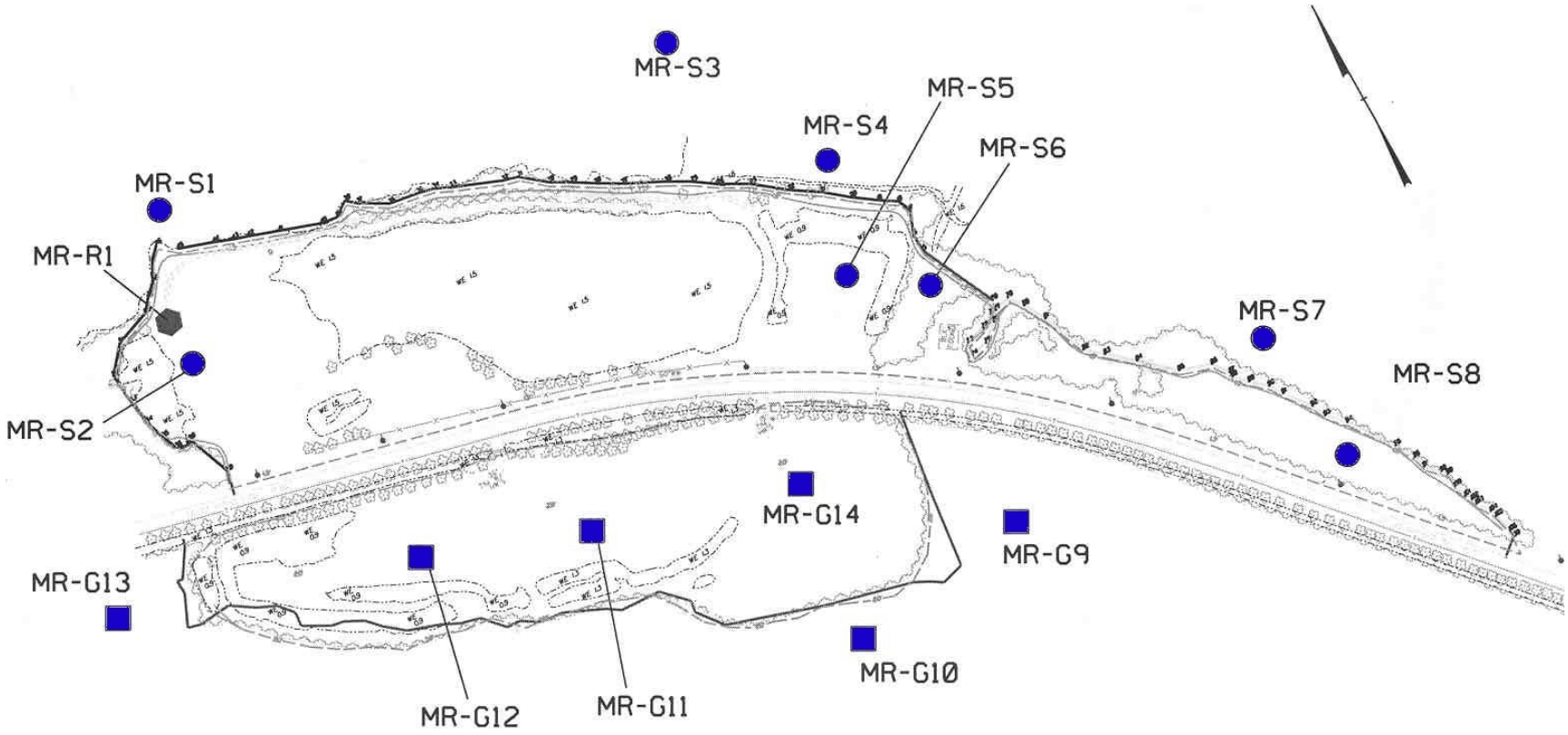
Figure 3 is a graphical representation of the hydrologic monitoring results for this year. A blue dot (or square) represents wetland hydrology for more than 12.5% of the season; a red dot/square indicates hydrology between 8% and 12.5%; a green dot/square represents hydrology between 5% and 8%.

For this time period from March to November, all six groundwater gauges met the jurisdictional hydrologic success of at least 12.5% during the growing season.

All eight surface gauges recorded that flooding occurred at least 12.5% of the growing season.

MASHOES ROAD MITIGATION SITE

DARE COUNTY



○ < 5% HYDROLOGY
● 5% - 8% HYDROLOGY
● 8% - 12.5% HYDROLOGY
● >12.5% HYDROLOGY

FIGURE 3: 2000 HYDROLOGIC RESULTS

2.3.2 Climatic Data

Figure 4 represents an examination of the local climate in comparison with historical data in order to determine whether 2000 was “average” in terms of climate conditions. The figure compares the rainfall from 2000 with that of historical rainfall (data collected between 1931 and 1999). All rainfall data was collected from the NC State Climate Office. The graph shows 1999 rainfall totals from September through December; the graphs also shows 2000 rainfall totals through July. Rainfall data for July through December 2000 will be presented in the 2001 Annual Monitoring Report.

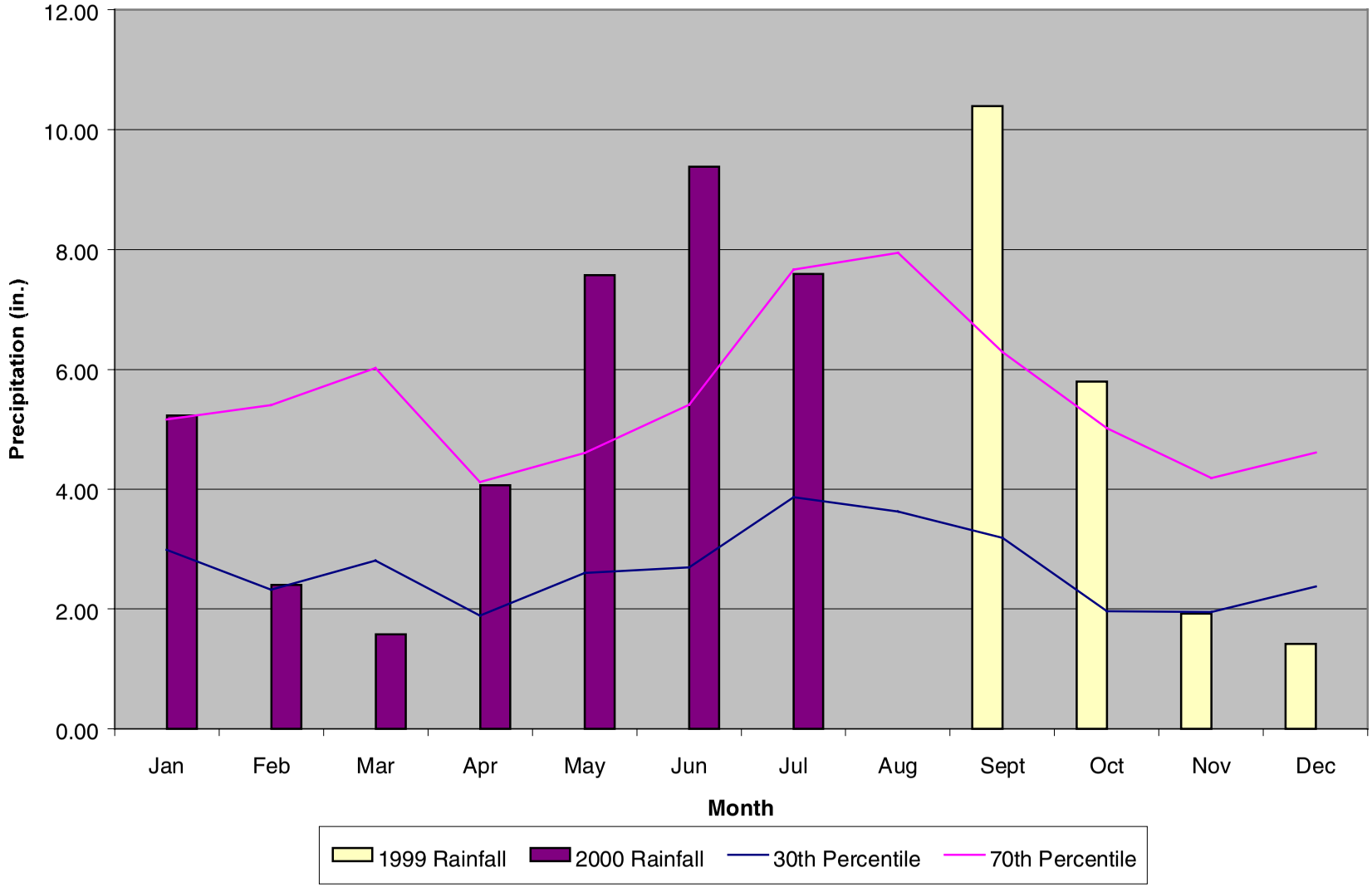
For 1999, September and October had especially high precipitation due to hurricane activity, whereas December was below normal. For 2000, March was below normal, whereas, May and June were higher than normal. Overall so far, 2000 has been an average year in terms of precipitation.

2.4 Conclusions

2000 represents the second full growing season that the hydrologic data has been examined. All six groundwater monitoring gauges met the jurisdictional wetland hydrology for 12.5% of the growing season; all eight surface gauges met the 12.5% requirement of daily flooding the site during this same period.

The overall monitoring results show that the site performed adequately from a hydrological standpoint.

FIGURE 4: Mashoes Road 30-70 Percentile Graph
Dare County



3.0 VEGETATION (YEAR 2 OF 5)

3.1 Success Criteria

NCDOT will monitor the site for five years. A 320 stems per acre survival criterion for planted seedlings will be used to determine success for the first three years. The required survival criterion will decrease by 10% per year after the third year of vegetation monitoring (i.e., for an expected 290 stems per acre for year 4, and 260 stems per acre for year 5). The number of plants of one species will not exceed 20% of the total number of plants of all species planted.

3.2 Description of Species

The following species were planted in the Wetland Restoration Area:

Zone 1: Wetland Tree Reforestation (2.7 acres)

Taxodium distichum, Bald Cypress

Quercus phellos, Willow Oak

Nyssa sylvatica, Black Gum

Fraxinus pennsylvanica, Green Ash

Quercus nigra, Water Oak

Zone 2: Wetland Tree Reforestation (4.3 acres)

Taxodium distichum, Bald Cypress

Fraxinus pennsylvanica, Green Ash

Quercus nigra, Water Oak

Quercus phellos, Willow Oak

3.3 Results of Vegetation Monitoring

Table 2

2000 VEGETATIVE MONITORING RESULTS

ZONE	Plot #	Green Ash	Willow Oak	Bald Cypress	Black Gum	Water Oak	Total (1 yr.)	Total (at planting)	Density (trees/acre)
1	1	10		3		1	14	40	238
	2	7	3	5			15	31	329
					ZONE 1 AVERAGE				284
2	3	2	1	19			22	34	440
	4			13			13	32	276
	5			10			10	32	213
					ZONE 2 AVERAGE				310
					TOTAL AVERAGE				299

To determine tree density, 50' x 50' plots are installed immediately following planting. The actual number of planted trees which occur within the plot are counted. This number is equated to the number within each plot, which represents 680 trees per acre (average). The survival monitoring number is compared to the planted number to obtain survival percentage. This percentage is applied to the 680 trees per acre to obtain an estimated tree per acre for the site. (Density = monitoring count / planted trees x 680)

Site Notes: Many of the plots contain Juncus americanus and scirpus. Other species noted on site include: phragmities, aster, goldenrod, black needlerush, spikerush and cattails.

3.4 Conclusions

Of the 399 acres on this site, approximately 7 involve tree planting. There were 5 plots established throughout the planting areas, encompassing all plant communities. The vegetation monitoring resulted in an average density of 299 trees per acre, which is below the 320 trees per acre required by the success criteria. NCDOT plans to replant the western side of the site in 2001.

The eastern side of the site was treated for phragmites in October 2000. This side of the site is scheduled for marsh grass plantings in Spring 2001.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

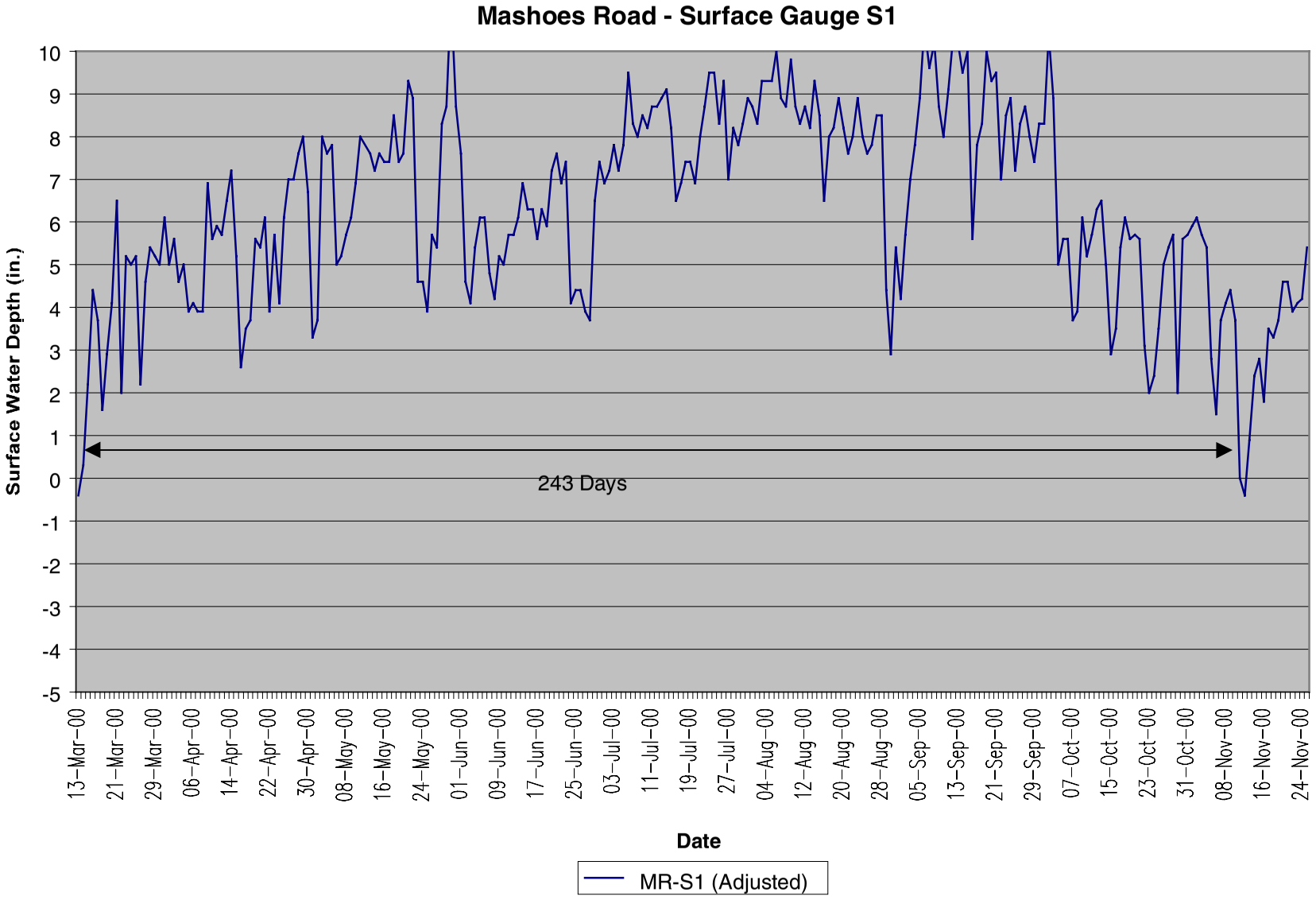
The overall monitoring results show that the site performed adequately from a hydrological standpoint.

NCDOT will complete planting of marsh grass in Spring 2001. The western side will be replanted with trees in Winter 2001.

NCDOT will continue to monitor the site for both hydrologic and vegetation success.

APPENDIX A

DEPTH TO GROUNDWATER PLOTS


Mashoes Road - Surface Gauge S1
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
243 Days
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
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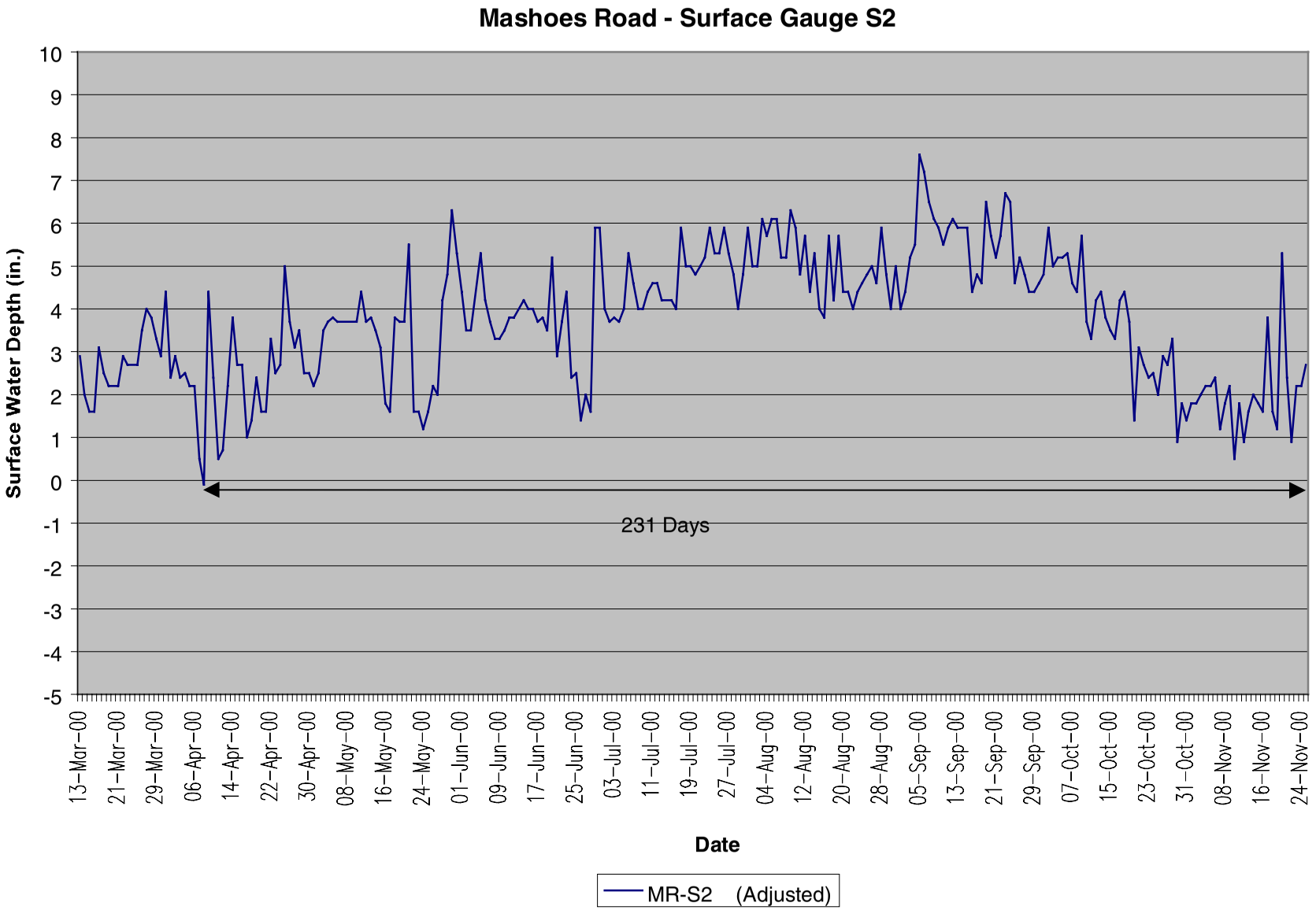
16-Nov-00
24-Nov-00
Date
MR-S1 (Adjusted)


Mashoes Road - Surface Gauge S2
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
231 Days
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
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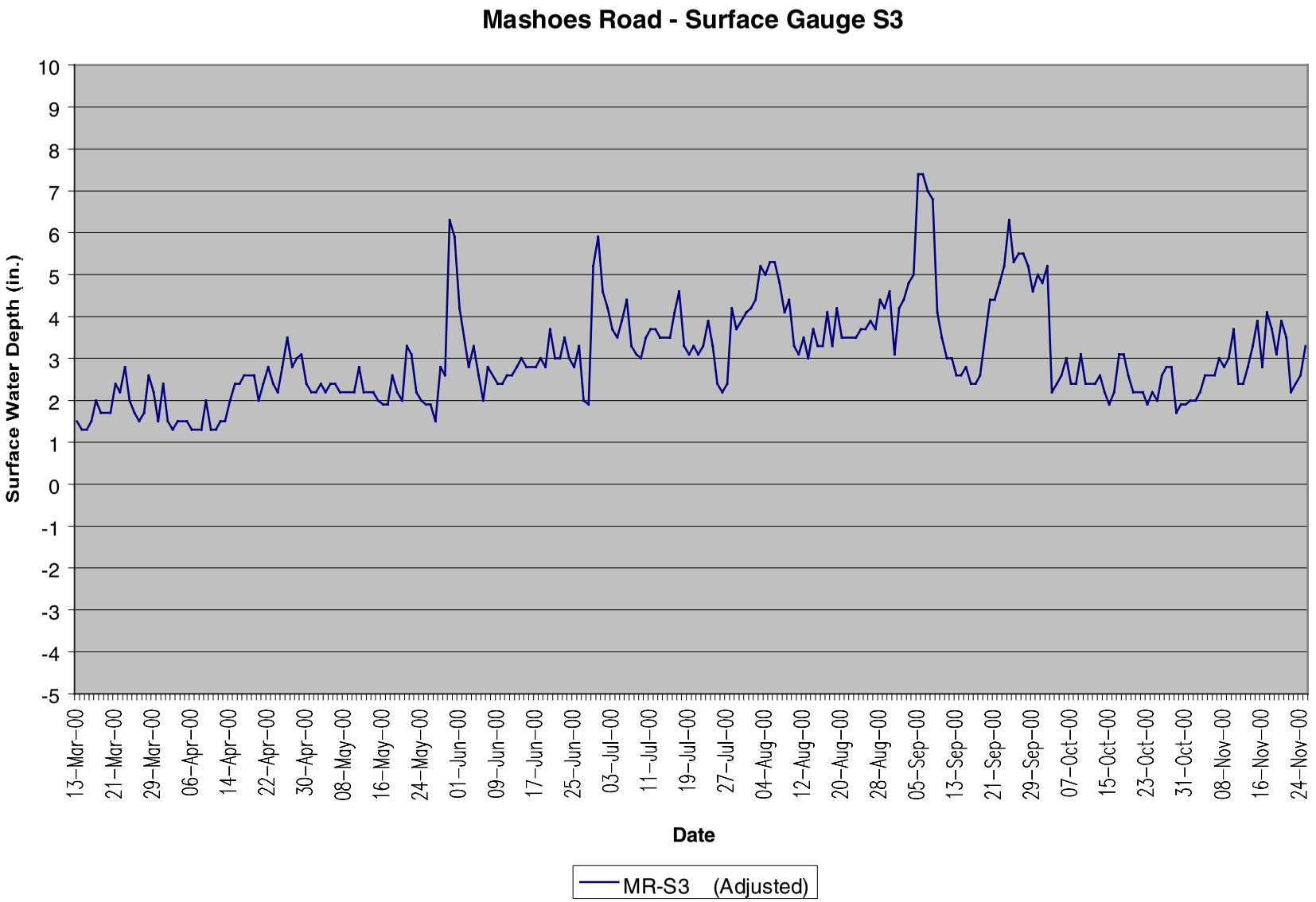
16-Nov-00
24-Nov-00
Date
MR-S2 (Adjusted)


Mashoes Road - Surface Gauge S3
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
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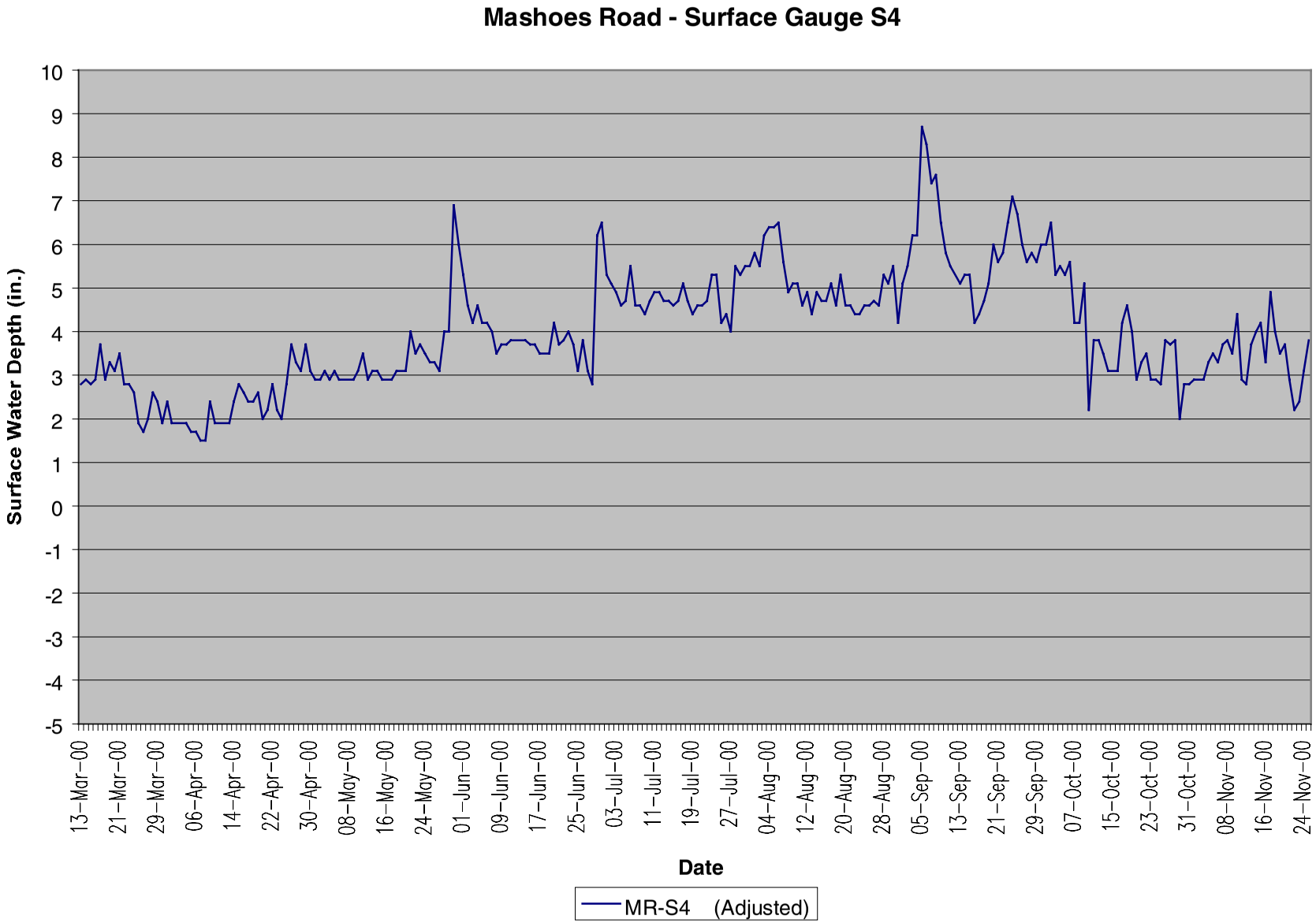
16-Nov-00
24-Nov-00
Date
MR-S3 (Adjusted)


Mashoes Road - Surface Gauge S4
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
07-Oct-00
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23-Oct-00
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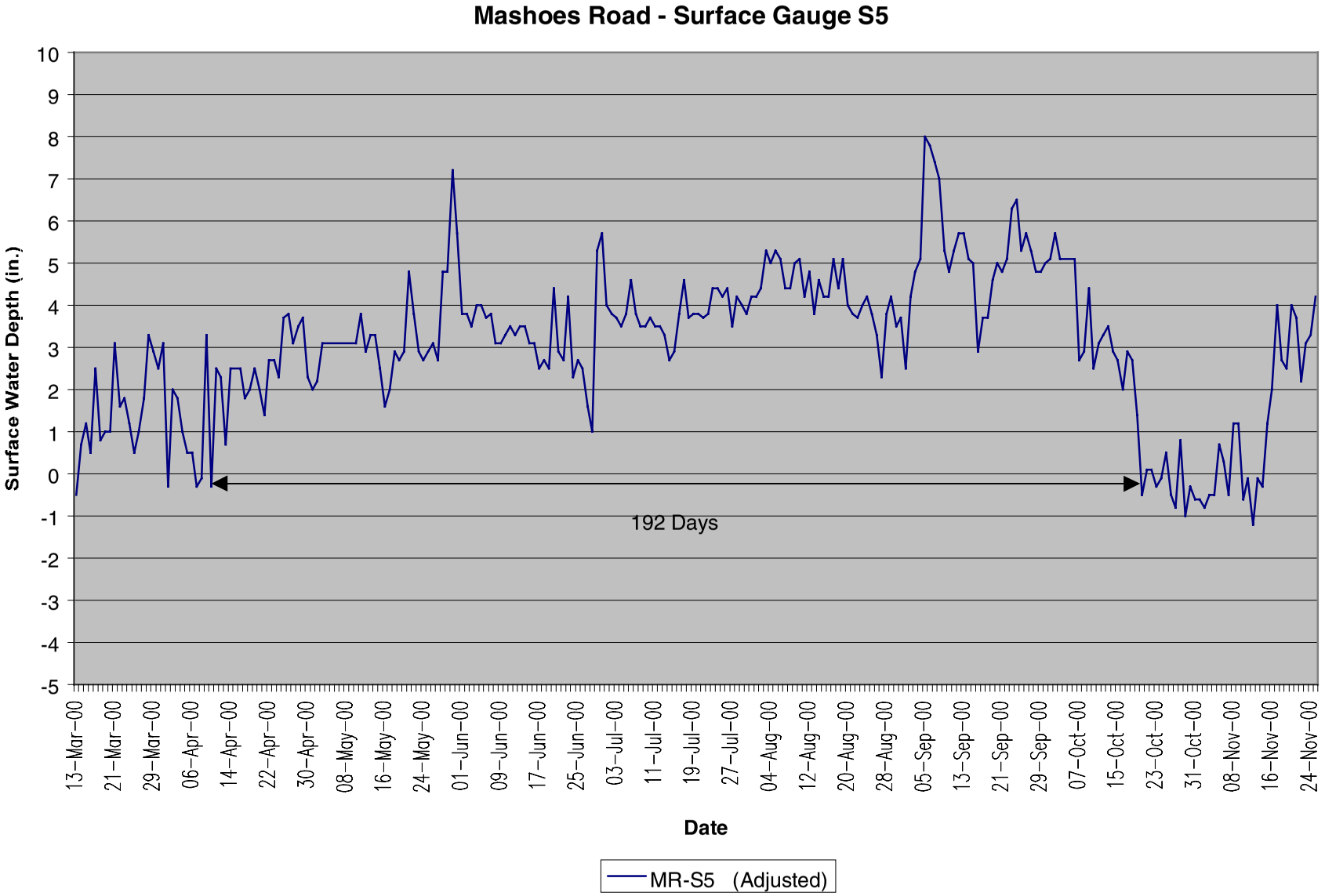
08-Nov-00
16-Nov-00
24-Nov-00
Date
MR-S4 (Adjusted)


Mashoes Road - Surface Gauge S5
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
192 Days
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
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03-Jul-00
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19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
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28-Aug-00
05-Sep-00
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21-Sep-00
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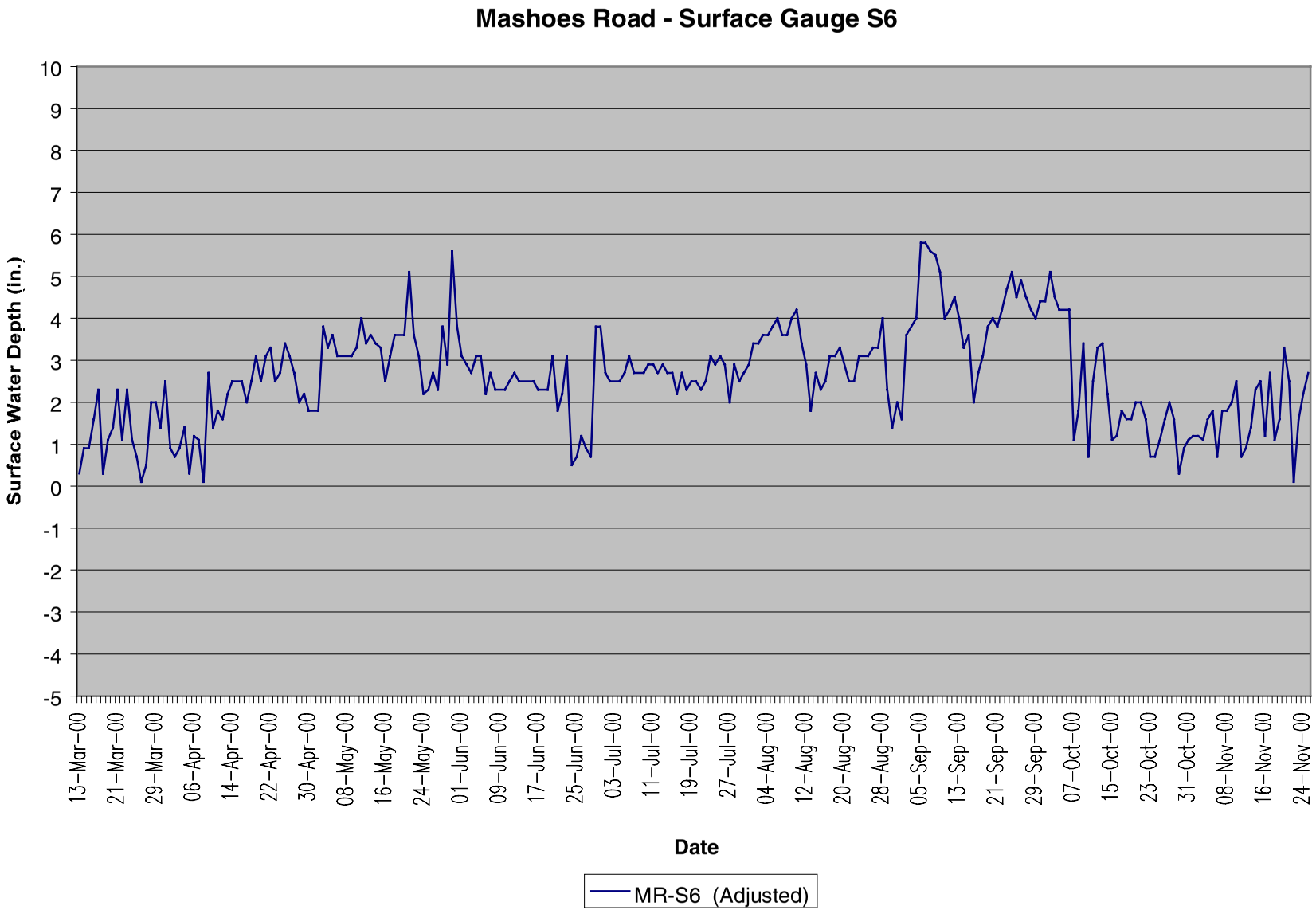
Date
MR-S5 (Adjusted)


Mashoes Road - Surface Gauge S6
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
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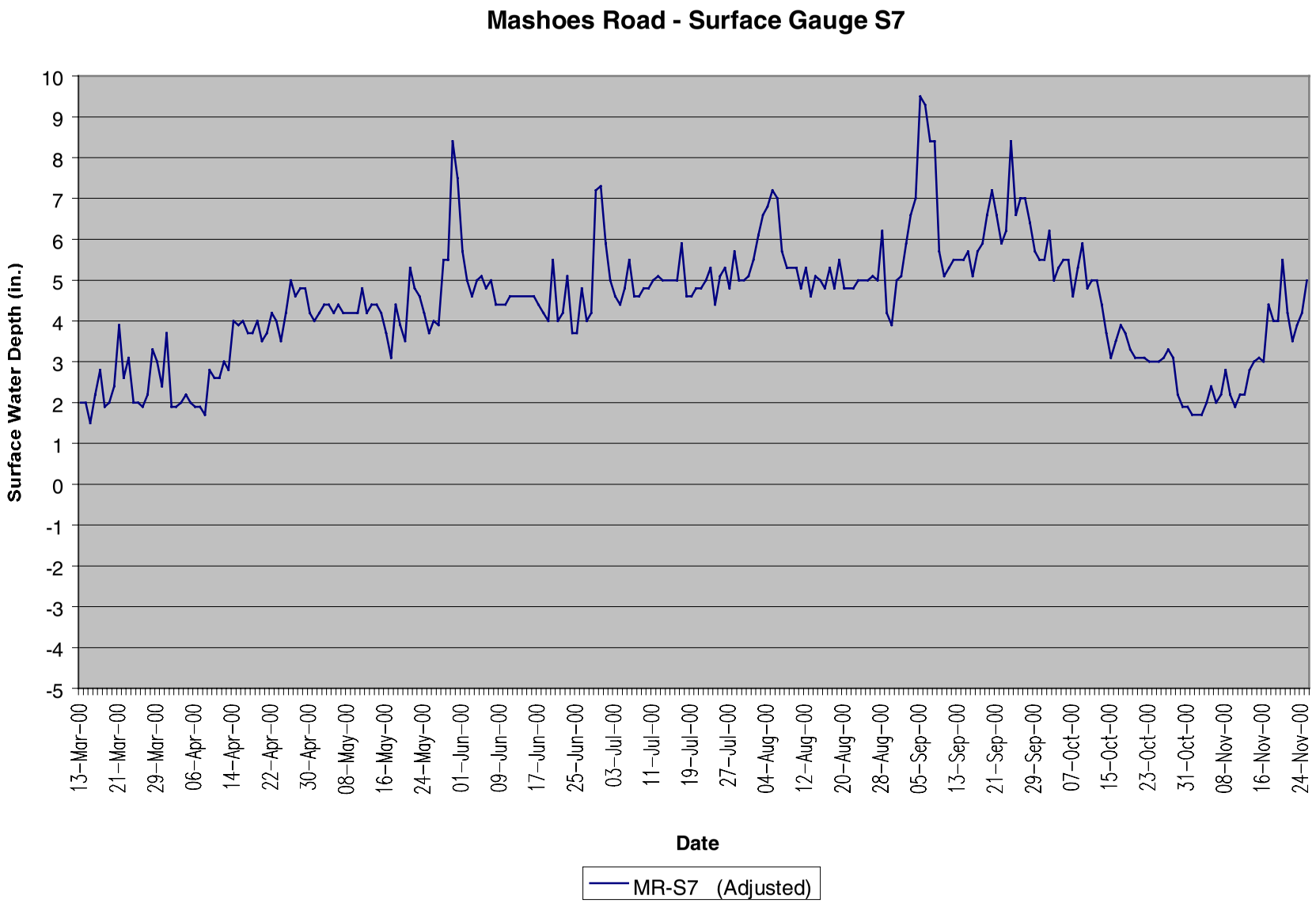
24-Nov-00
Date
MR-S6 (Adjusted)


Mashoes Road - Surface Gauge S7
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
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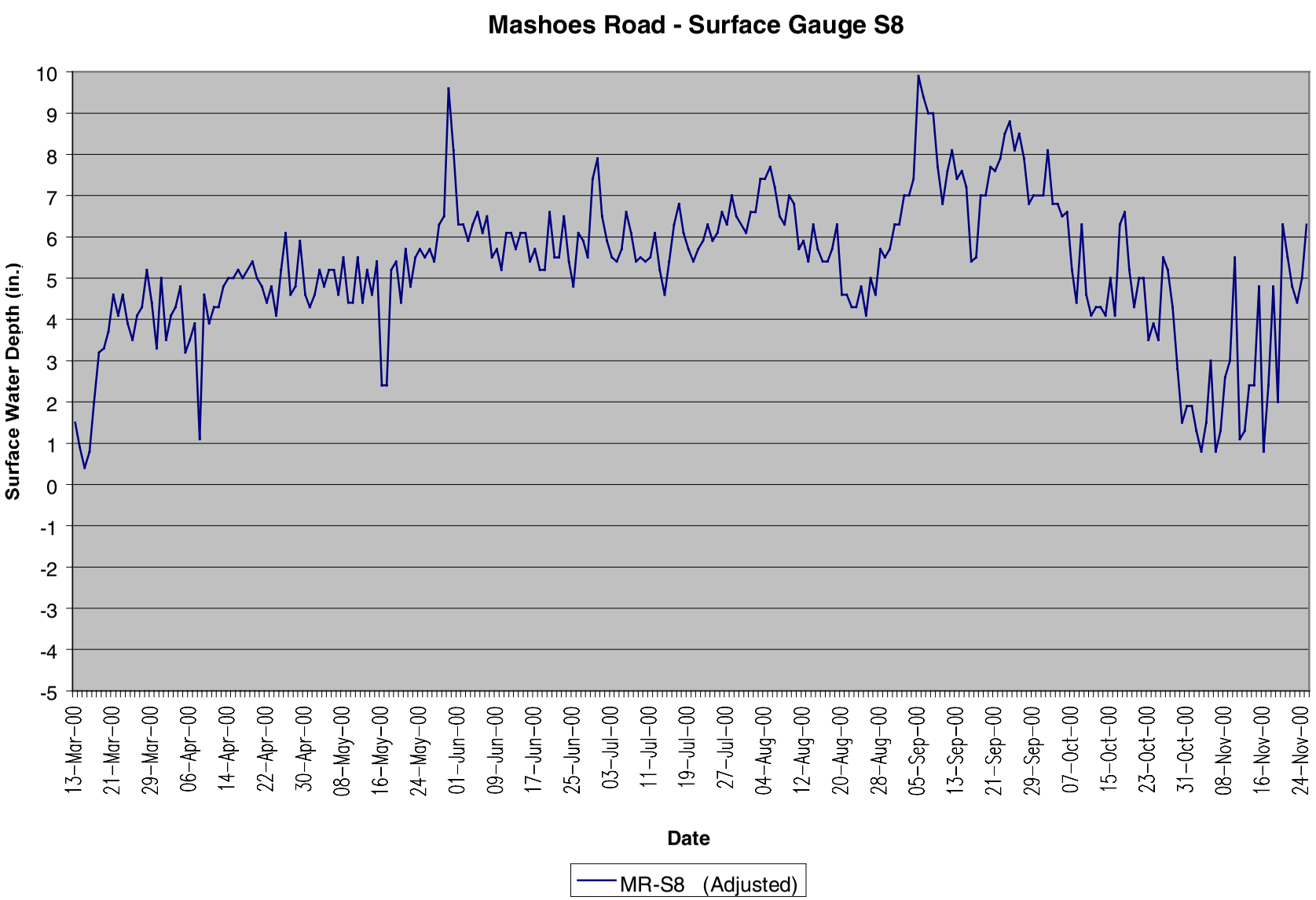
24-Nov-00
Date
MR-S7 (Adjusted)


Mashoes Road - Surface Gauge S8
Surface Water Depth (in.)
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
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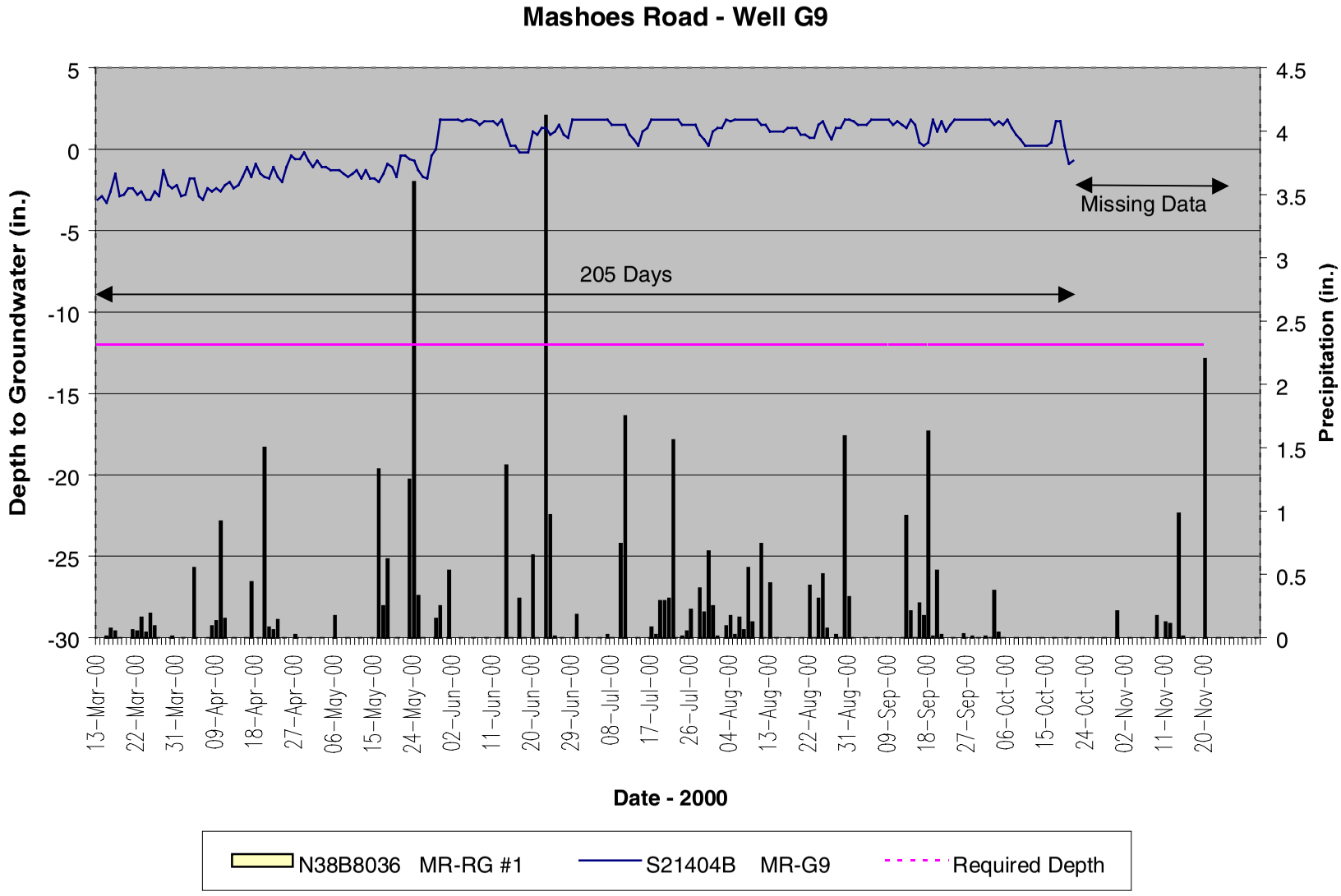
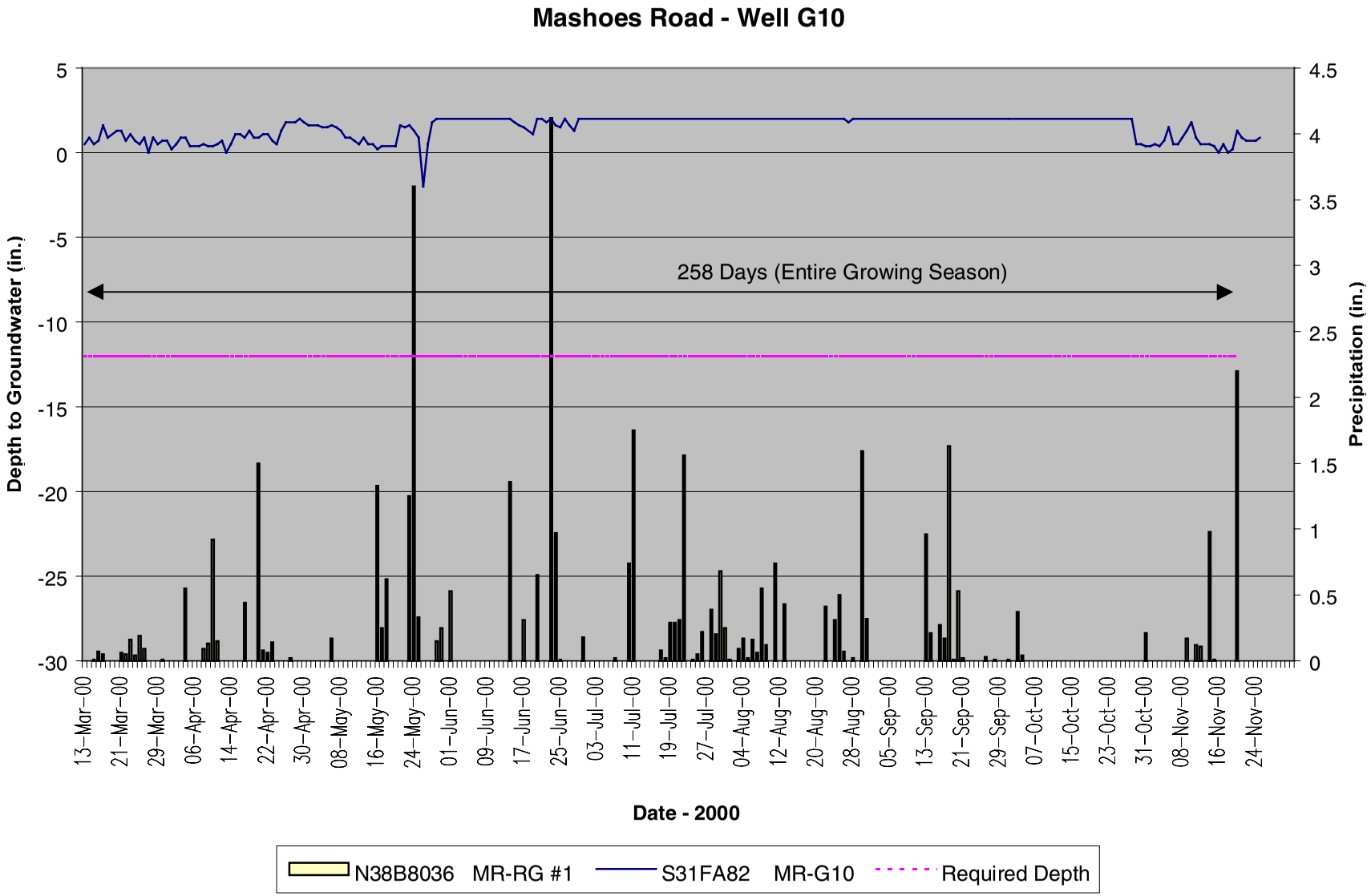
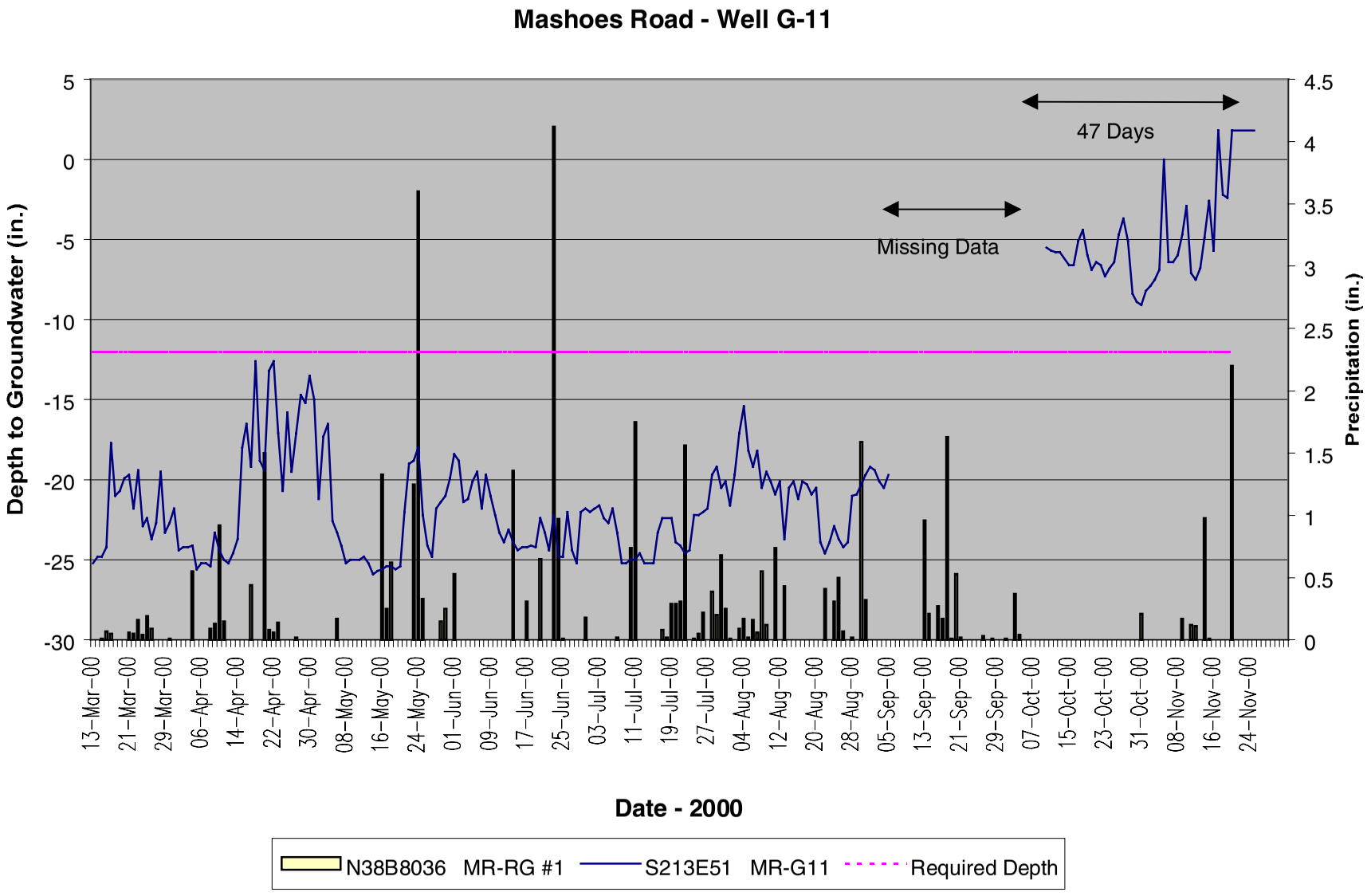
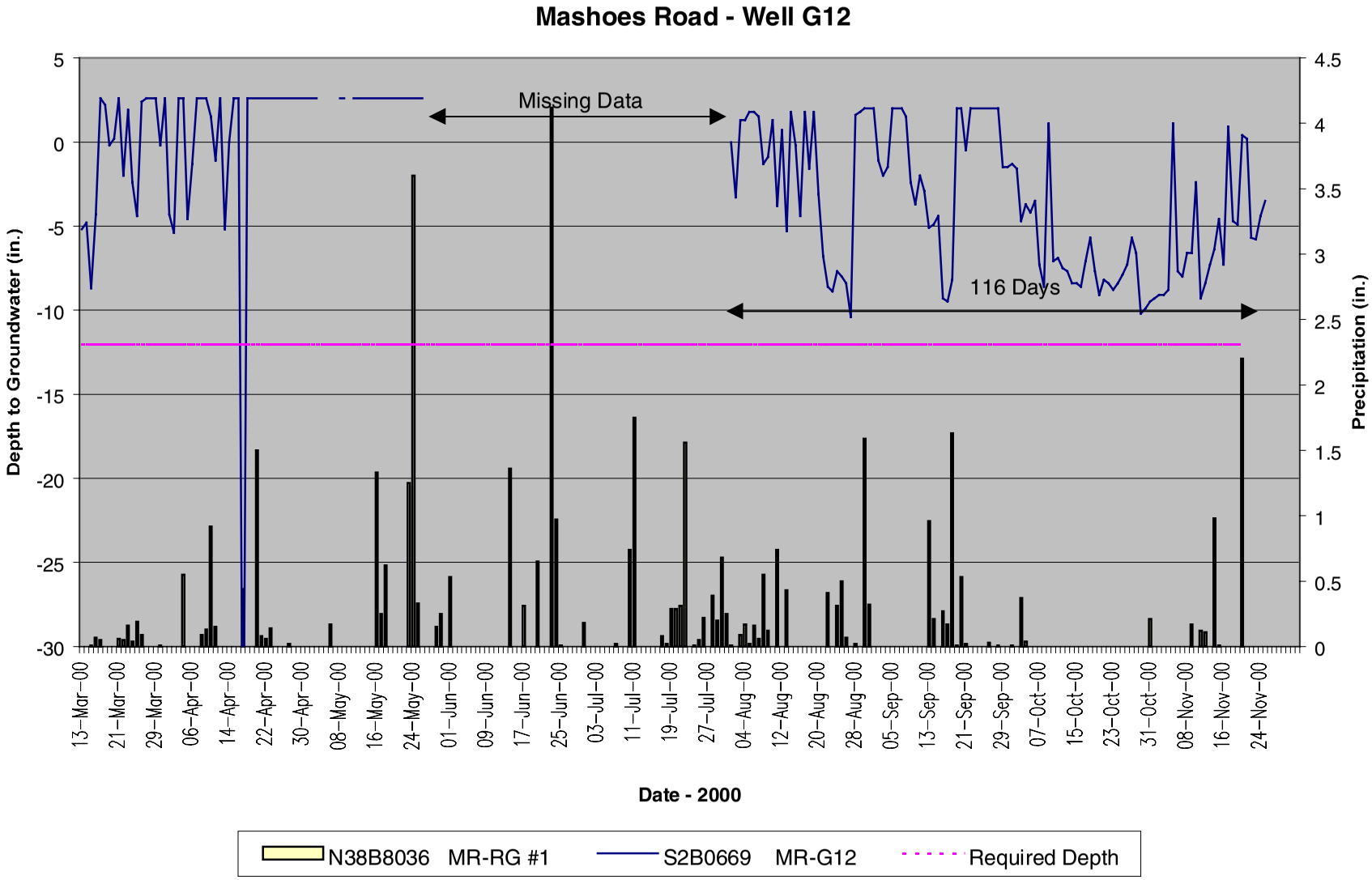
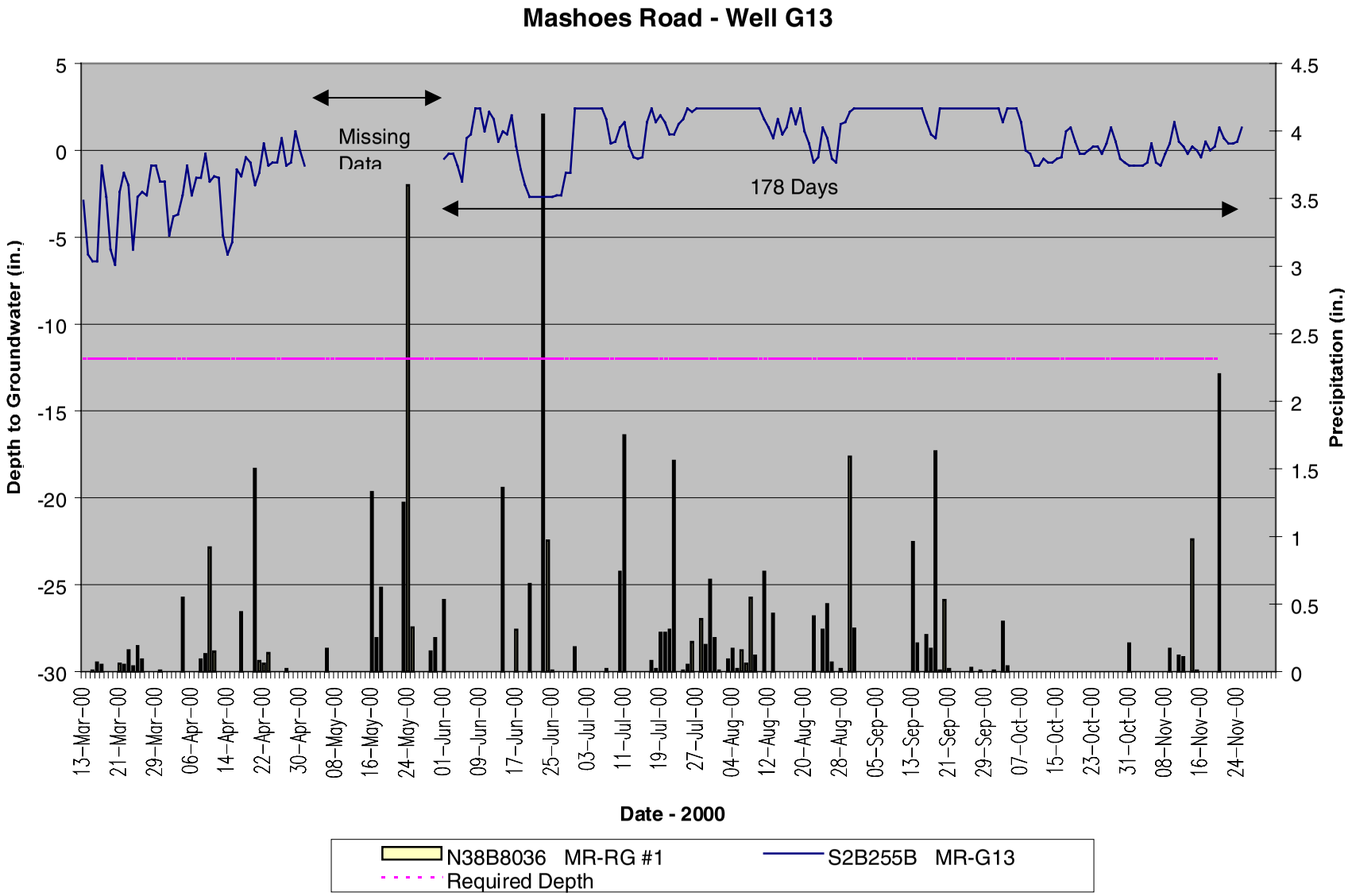
16-Nov-00
24-Nov-00
Date
MR-S8 (Adjusted)

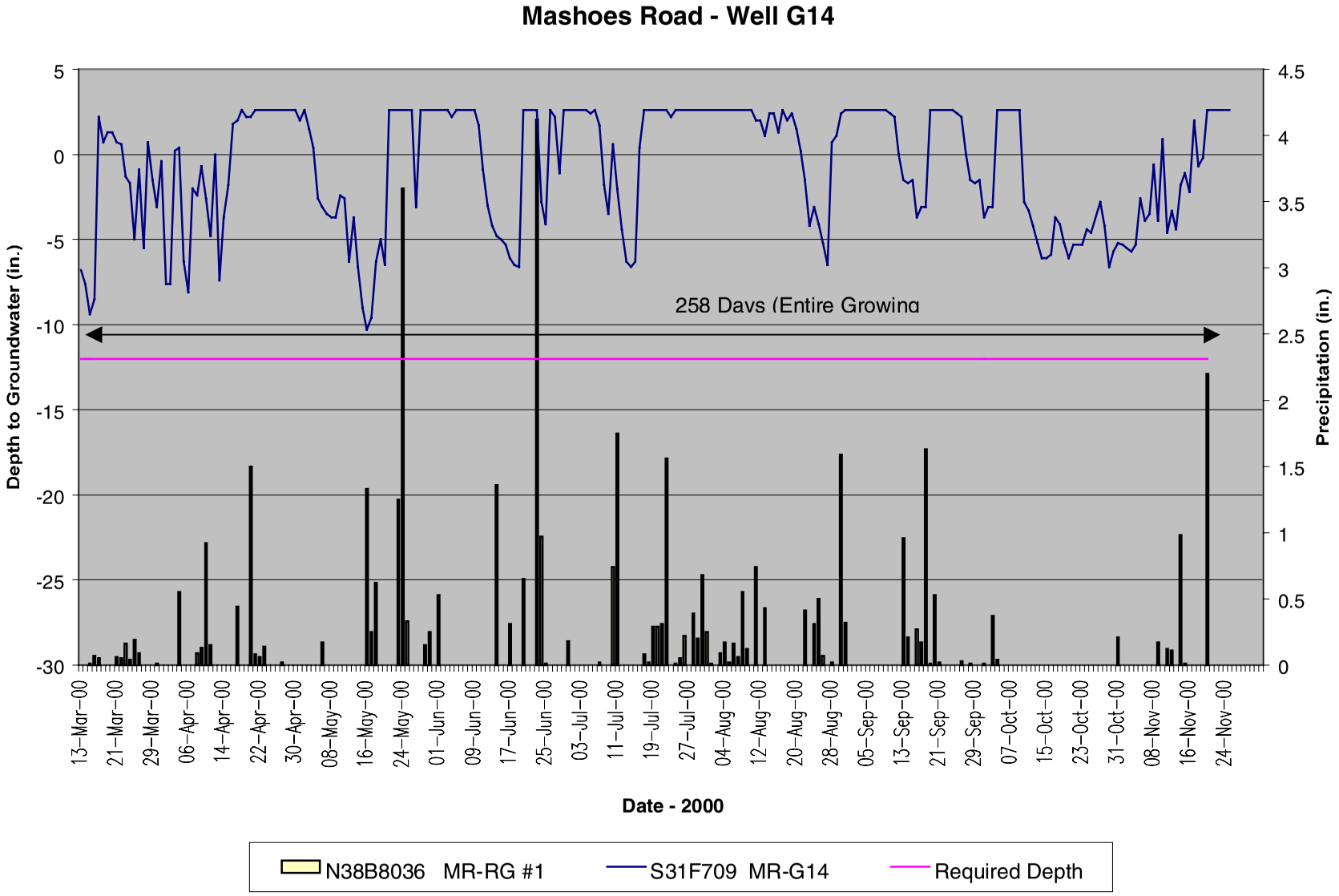

Mashoes Road - Well G9
Depth to Groundwater (in.)
Precipitation (in.)
Missing Data
205 Days
Date - 2000
N38B8036 MR-RG #1
S21404B MR-G9
Required Depth


Mashoes Road - Well G10
Depth to Groundwater (in.)
Precipitation (in.)
5
0
-5
-10
-15
-20
-25
-30
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
258 Days (Entire Growing Season)
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
07-Oct-00
15-Oct-00
23-Oct-00
31-Oct-00
08-Nov-00
16-Nov-00
24-Nov-00
Date - 2000
N38B8036 MR-RG #1
S31FA82 MR-G10
Required Depth


Mashoes Road - Well G-11
Depth to Groundwater (in.)
Precipitation (in.)
47 Days
Missing Data
5
0
-5
-10
-15
-20
-25
-30
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
07-Oct-00
15-Oct-00
23-Oct-00
31-Oct-00
08-Nov-00
16-Nov-00
24-Nov-00
Date - 2000
N38B8036 MR-RG #1
S213E51 MR-G11
Required Depth


Mashoes Road - Well G12
Missing Data
116 Days
Depth to Groundwater (in.)
Precipitation (in.)
5
0
-5
-10
-15
-20
-25
-30
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
07-Oct-00
15-Oct-00
23-Oct-00
31-Oct-00
08-Nov-00
16-Nov-00
24-Nov-00
Date - 2000
N38B8036 MR-RG #1
S2B0669 MR-G12
Required Depth

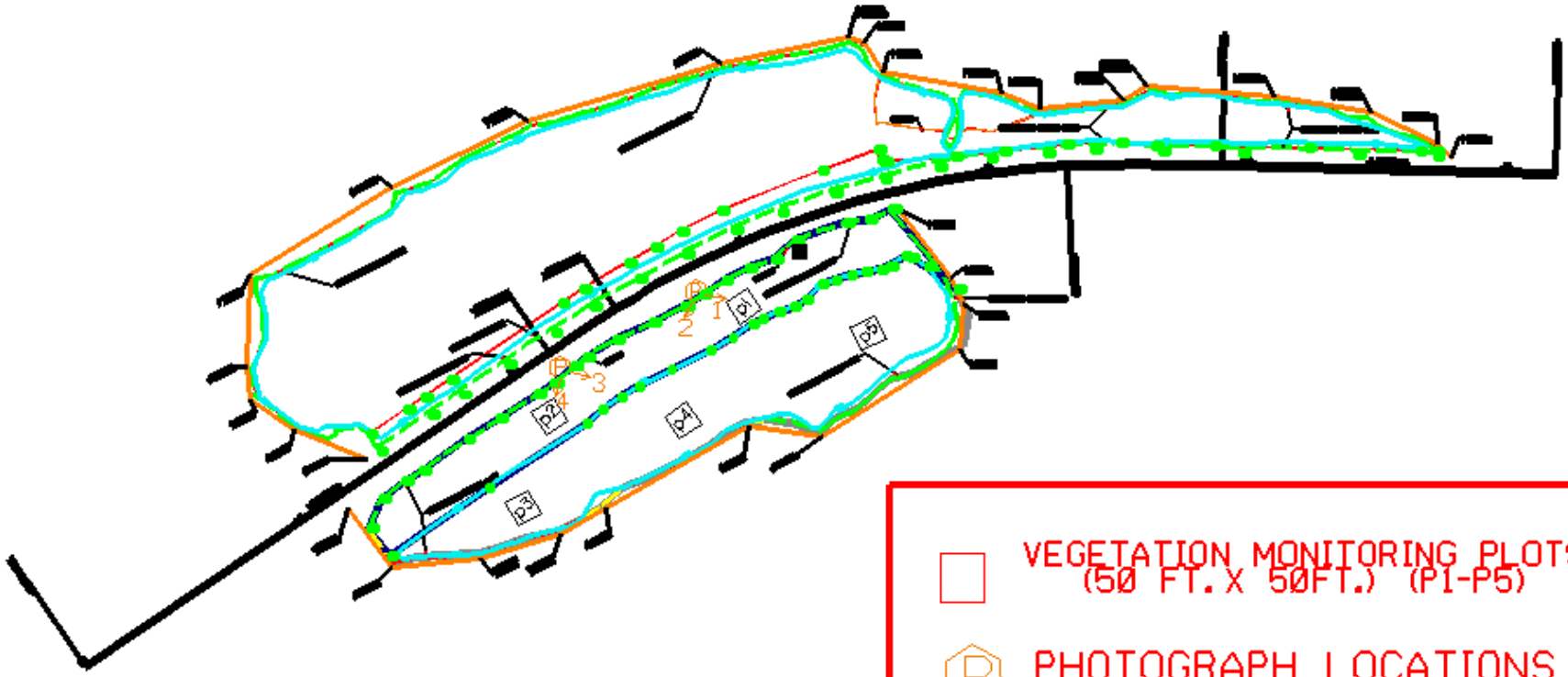

Mashoes Road - Well G13
Missing Data
178 Days
Depth to Groundwater (in.)
Precipitation (in.)
5
0
-5
-10
-15
-20
-25
-30
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
13-Mar-00
21-Mar-00
29-Mar-00
06-Apr-00
14-Apr-00
22-Apr-00
30-Apr-00
08-May-00
16-May-00
24-May-00
01-Jun-00
09-Jun-00
17-Jun-00
25-Jun-00
03-Jul-00
11-Jul-00
19-Jul-00
27-Jul-00
04-Aug-00
12-Aug-00
20-Aug-00
28-Aug-00
05-Sep-00
13-Sep-00
21-Sep-00
29-Sep-00
07-Oct-00
15-Oct-00
23-Oct-00
31-Oct-00
08-Nov-00
16-Nov-00
24-Nov-00
Date - 2000
N38B8036 MR-RG #1
S2B255B MR-G13
Required Depth


Mashoes Road - Well G14
Depth to Groundwater (in.)
Precipitation (in.)
258 Days (Entire Growing
Date - 2000
N38B8036 MR-RG #1
S31F709 MR-G14
Required Depth

APPENDIX B

PHOTO AND VEGETATION PLOT LOCATIONS, SITE PHOTOS

DARE COUNTY, NORTH CAROLINA
MASHOES ROAD MITIGATION SITE
Photo and Vegetation Plot Locations
2000 MONITORING



VEGETATION MONITORING PLOTS
(50 FT. X 50FT.) (P1-P5)

PHOTOGRAPH LOCATIONS

Mashoes Road - Photos

Photo 1

Photo 2

Photo 3

Photo 4